WIENER
Plein & Baus Elektronik

Werk für Industrie-elektronik
Nuklear-elektronik
Regelungs-technik

A Phoenix Mecano Company

Series 3000

6U VME Crate

Manual

General Remarks

The only purpose of this manual is a description of the product. It must not be interpreted as a declaration of conformity for this product including the product and software.

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Control Cabinet

In the context of this user manual, the control cabinet must fulfill the requirements on fire-protective enclosures according to EN 60950 / IEC 60950 / UL 60950.

All devices are intended for operation in control cabinets or in closed areas. The LAN connection and all wire connections between the different system parts must be done via shielded cable with conductive connector shells, which are fixed with screws.

Furthermore, an additional fire-protective enclosure is required which must not affect proper air circulation.

Safety

After connecting the Crate to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. The DC-On-Signal as well as a power switch at control board (if any installed) operates as a DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

Before starting any kind of work inside the power box remove the unit from mains and wait a couple of minutes with your activities! Discharge the primary DC Filter-capacitors by use of a well isolated 22 ohm 10W resistor.

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1 General Information

Features

- **16 VME 64X slots 160mm with 80mm transition slots at the rear**
- **Fan tray removable, fully controlled**
- **Up to 2 CPIC power supplies (redundant operation, 500 W each)**
- **ON/OFF switch, VME/CPCI RESET button and 10 LEDs at the front panel**
- **Separate power supply for fan & control, independent from CPCI power**
- **Fully controlled, programmable trip thresholds (min./max. voltage, max. temperature)**
- **Voltage & Temperature measurement**
- **Ethernet connection IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX**
- **WWW-Server integrated, full control via SNMP protocol**
- **8 Digital inputs (2 optocouplers)**
- **8 Digital outputs: (2 optocouplers)**
- **4 Analog inputs**
- **PC-Control (connected to galvanic isolated USB) with free available software**
- **Switchable mains output (optional)**
- **Optional CAN-bus (galvanic isolated)**

The W-IE-NE-R VME 3000 crates combine the advantages of standard Compact PCI power supplies with the features of our high-end VME 6000 systems.

A VME 3000 crate is consisting of the 19”/7U bin with VME64x backplane, the control & measurement unit CML02, a removable fan tray and up to two 6U CPCI power supplies.

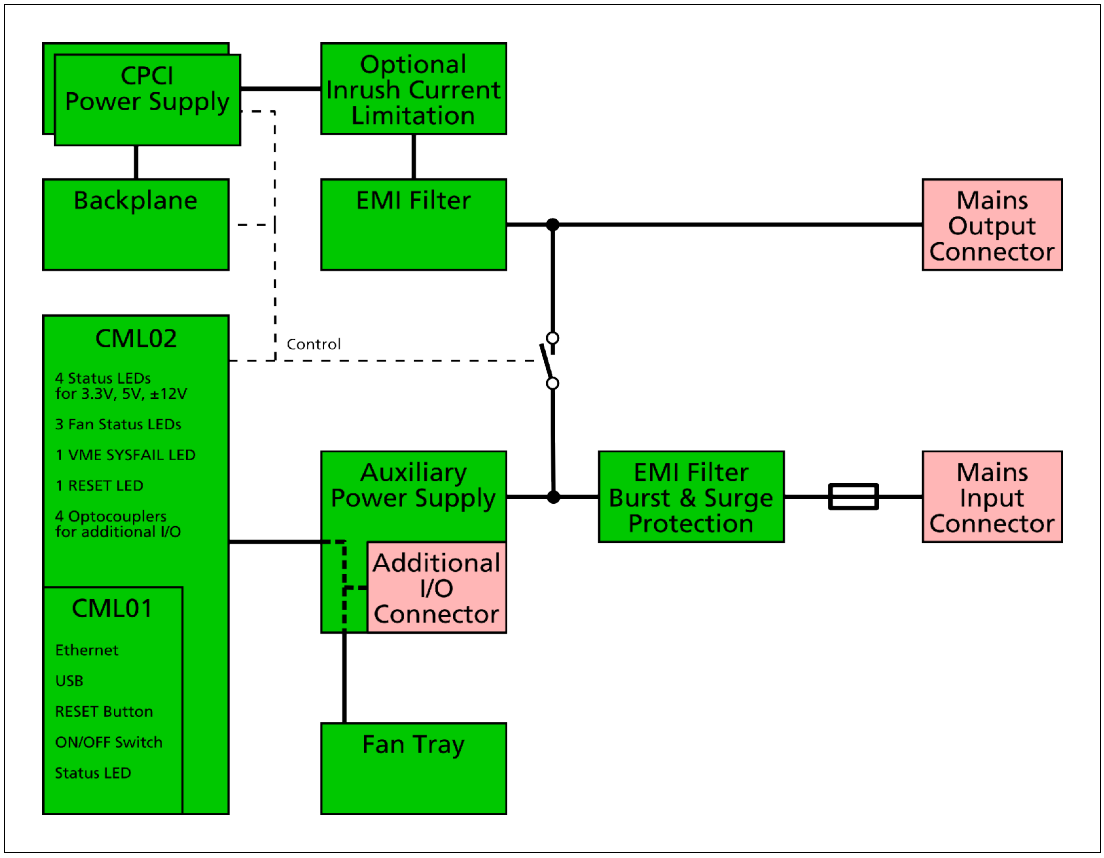


Figure 1.1: VME 3000 Block Diagram

The filtered mains is connected to an auxiliary power supply, which generates the necessary power to operate the CML02.

If the system is switched on (with the front panel switch or via network) a power relay is closed and the CPCI power supplies are connected to the mains.

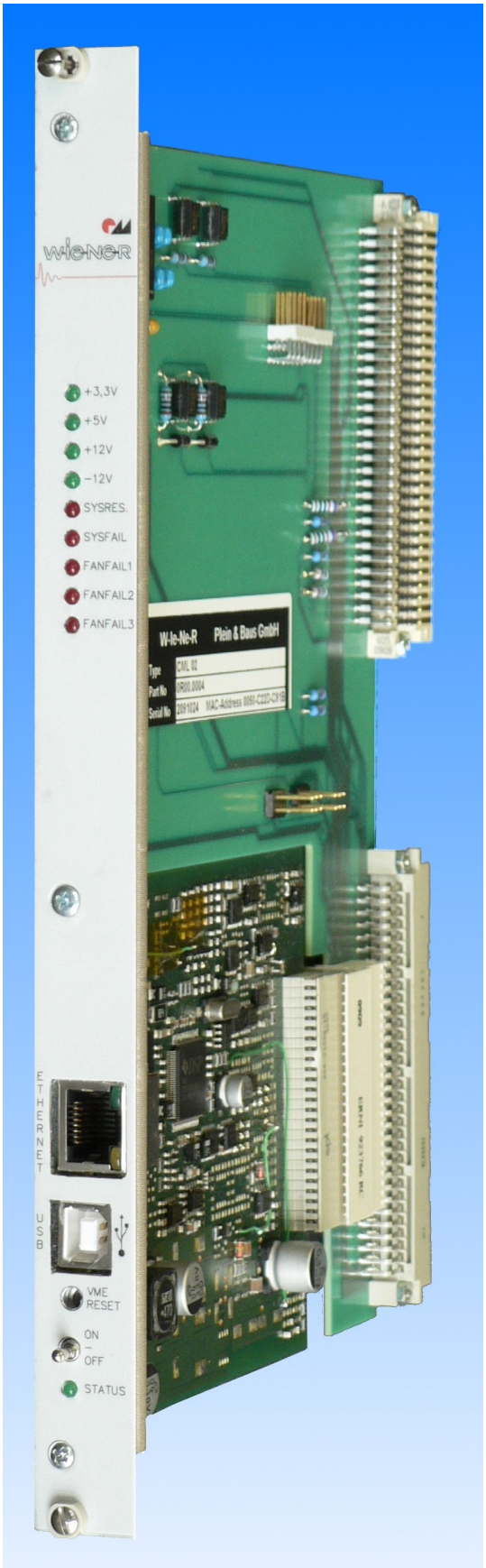
The inrush current of CPCI power supplies can be quite high, so an optional inrush current limitation circuit is implemented. (This option is recommended if many VME 3000 crates are connected to a single fuse)

After the VME voltages reach their correct values, VME SYSRESET is deactivated. From now on the voltages are compared with individual settable thresholds. If a failure is detected, the crate can switch off automatically.

The fans inside the easy exchangeable fan tray are controlled and monitored by the CML, too. Because of the independent auxiliary power supply it is possible to cool down the crate after switching off the main supply, if required.

Additional analog and digital input/output signals, which are provided by the CML02, are accessible at a 40 pin connector at the rear of the crate.

2 CML 02 Front Panel Elements



The V3000 crate is controlled by the CML02 (Control Measurement and Data Logging System) plugged into VME slot 17.

2.1 LEDs

- +3.3 V green LED, lighting if the 3.3 V system voltage is OK
- +5 V green LED, lighting if the 5 V system voltage is OK
- +12 V green LED, lighting if the +12 V system voltage is OK
- -12 V green LED, lighting if the -12 V system voltage is OK
- SYSRES red LED, lighting if the VME/CPCI bus reset signal is active
- SYSFAIL red LED, lighting if the VME SYSFAIL signal is active
- FAN 1 red LED, lighting if the left fan of the fan tray is defect
- FAN 2 red LED, lighting if the left fan of the fan tray is defect
- FAN 3 red LED, lighting if the right fan of the fan tray is defect
- STATUS green LED, lighting if the system is switched on

2.2 Power Switch

The power switch is used to switch the system power supply on (push the switch to the “ON” position) or off (push the switch to the “OFF” position.

2.3 Bus Reset Button

If the bus reset button is pressed, the VME/CPCI RESET signal is activated for 200 ms. The button is sunk behind the front panel to prevent accidental activation.

2.4 Ethernet Connector

RJ45 Socket	Pin	Signal	Comment
	1	TX+	
	2	TX-	
	3	RX+	
	4	GND 1	
	5	GND 1	
	6	RX-	
	7	GND 2	
	8	GND 2	

Table 1: Ethernet Connector Pin Assignment

This is the standard NIC configuration. **You need a** 1:1-cable to connect a to a HUB, or a **cross-over cable to connect to** another NIC (e.g. **a computer**). *There is no automatic signal crossing like with some routers*.

2.5 USB Connector

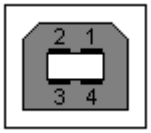
USB Socket	Pin	Signal	Comment
	1	VCC	
	2	D-	
	3	D+	
	4	GND	

Table 2: USB Connector Pin Assignment

This is the standard USB connector type B.

The USB connection is galvanic isolated from the system to prevent ground loops.

3 Temperature Sensor Inputs

The CML02 has 8 temperature sensor inputs (semiconductor sensors with 1 kOhm resistance at 25°C).

The System 3000 can be ordered with already installed sensors (option), for example one sensor at each CPCI power supply and one sensor at VME slot 1.

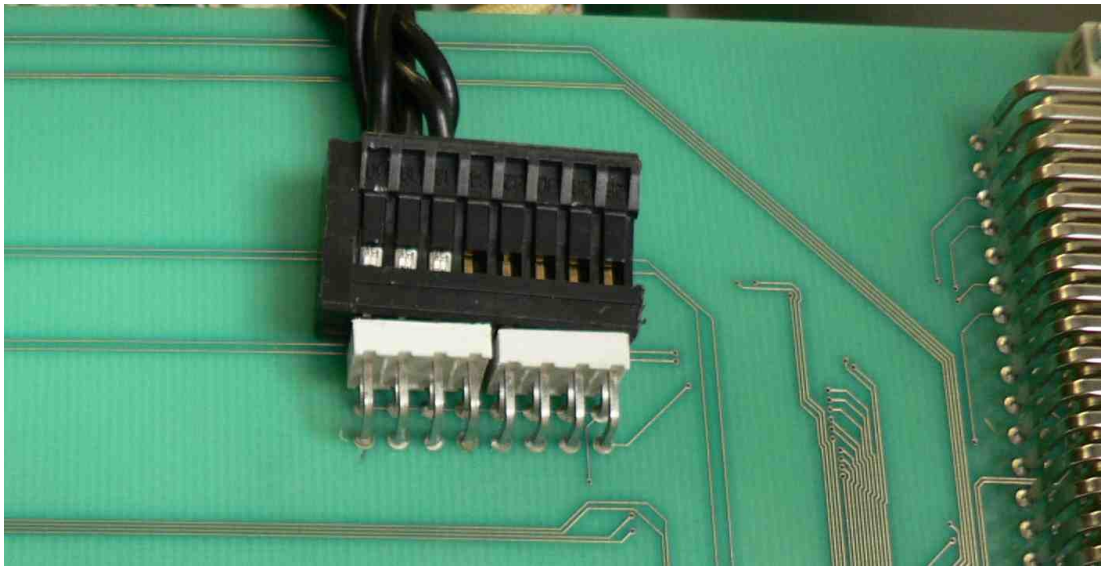


Figure 3.1: Temperature Sensor Connection to CML02

The temperatures can be read with the SNMP network command (crate.sensor.sensorTemperature OID).

Each temperature is compared with two threshold values (crate.sensor.sensorWarningThreshold and crate.sensor.sensorFailureThreshold OIDs).

If the sensorWarningThreshold threshold of any connected sensor is reached, all fans will switched to their maximum speed.

If the sensorFailureThreshold of any connected sensor is reached, the main power supply of the system is switched off.

4 Additional Control & Measurement Signals

Additional analog and digital inputs and digital outputs are available at a 40 pin connector at the transition cage of the crate.

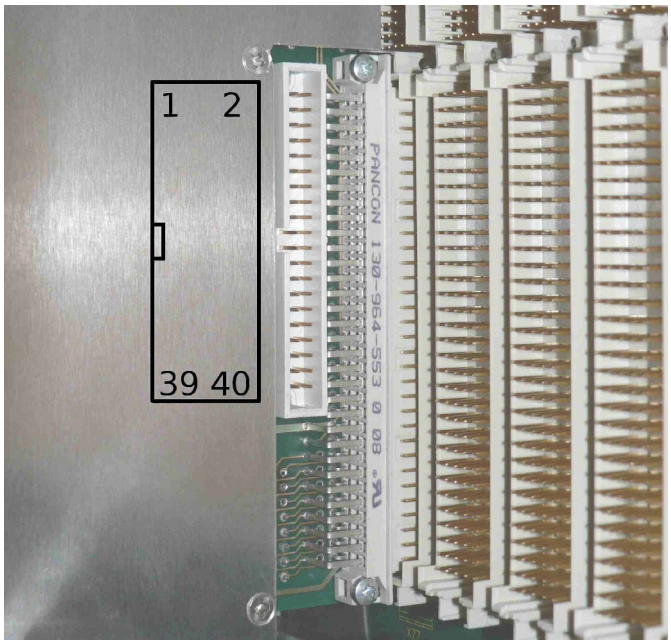


Figure 4.1: Control & Measurement Signal Connector

40 Pin Connector	Pin	Signal	Pin	Signal
	1	reserved	2	reserved
	3	reserved	4	reserved
	5	reserved	6	reserved
	7	reserved	8	reserved
	9	reserved	10	A0+
	11	A1+	12	A0-
	13	A1-	14	A2+
	15	A3+	16	A2-
	17	A3-	18	DI0+ (Optocoupler LED anode)
	19	DO0+ (Optocoupler Transistor C)	20	DI0- (Optocoupler LED cathode)
	21	DO0- (Optocoupler Transistor E)	22	DI1+ (Optocoupler LED anode)
	23	DO1+ (Optocoupler Transistor C)	24	DI1- (Optocoupler LED cathode)
	25	DO1- (Optocoupler Transistor E)	26	DI2 (TTL)
	27	DO2 (TTL 5V)	28	DI3 (TTL)
	29	DO3 (TTL 5V)	30	DI4 (TTL)
	31	DO4 (TTL 5V)	32	DI5 (TTL)
	33	DO5 (TTL 5V)	34	DI6 (TTL)
	35	DO6 (TTL 5V)	36	DI7 (TTL)
	37	DO7 (TTL 5V)	38	GND
	39	reserved	40	reserved

Table 3: Control & Measurement Signal Connector

4.1 Analog Inputs

The analog inputs A0 ... A3 have differential inputs (0-3V operating range). The schema of the input stage is shown in the following figure.

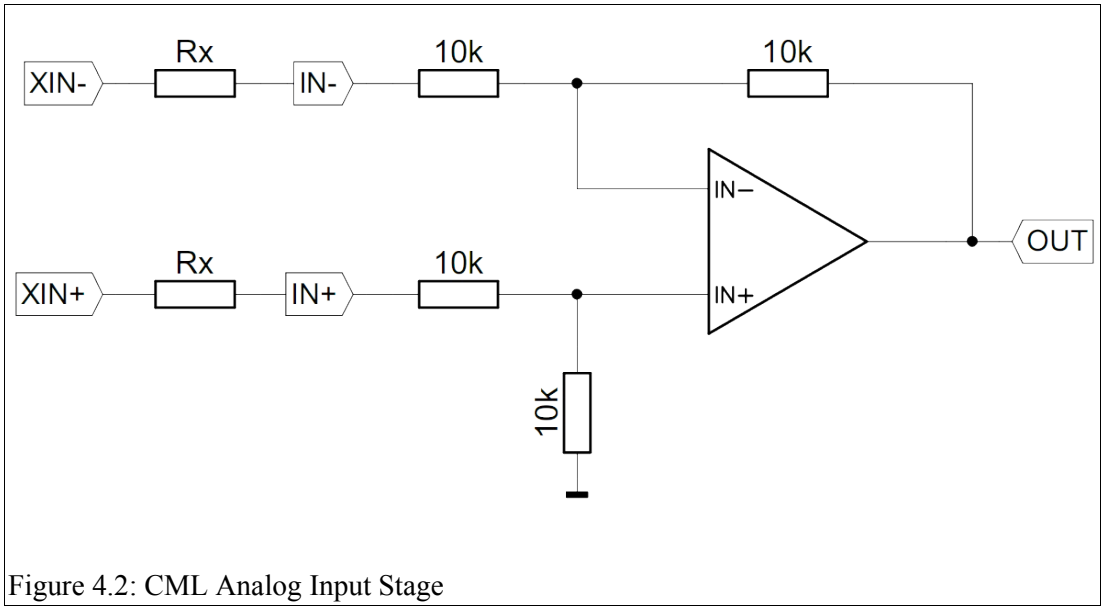


Figure 4.2: CML Analog Input Stage

All resistors are low TK with 0.1% tolerance, so the input range can be changed by adding additional precision resistors without need for re-calibration.

The external voltage range can be calculated with

$$U_{XIN} = \frac{R_X + 10\,K\Omega}{10\,K\Omega} \cdot 3\,V$$

The data can be accessed via SNMP (crate.signal.analogMeasurementVoltage OID).

4.2 Digital Inputs

The digital inputs DI0 and DI1 are galvanic isolated with an optocoupler (SFH610). Both anode and cathode are accessible. To protect the device, a 120 ohm series resistor is implemented.

The digital inputs DI2 ... DI7 are standard TTL inputs

The inputs can be read by SNMP network commands (crate.signal.digitalInput OID)

4.3 Digital Outputs

The digital outputs DO0 and DO1 are galvanic isolated with an optocoupler (SFH610). Both emitter and collector are accessible.

The digital outputs DO2 ... DO7 are push/pull 5V CMOS TTL outputs

The outputs can be set/reset by SNMP network commands (crate.signal.digitalOutput OID)

5 Fans

5.1 Fan Speed Measurement

The rotation speed of each of the 3 fans inside of the fan tray is measured simultaneously.

The fan rotation speed is accessible with SNMP network commands (crate.fantray.fanSpeed OID)

5.2 Fan Speed Regulation

The nominal fan speed is changeable with the SNMP network commands (crate.fantray.fanNominalSpeed OID)

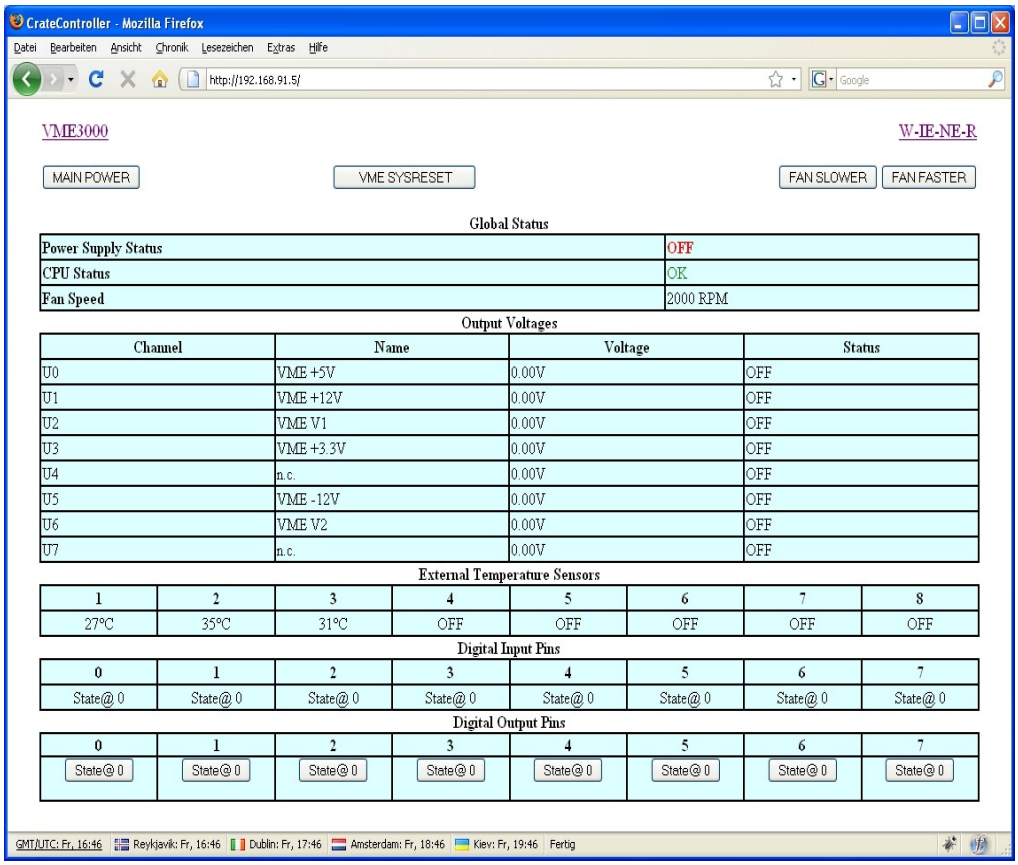
6 CML Setup via USB

The CML02 is delivered completely configured for the system. If desired, the CML can be controlled with the MUSEcontrol software.

The operation and usage of this software is described in a separate manual (CML01 – Control, Measurement & Data Logging System, document number *01773.A0).

7 Web Server

The CML02 has a built-in web-server which allows the monitoring of the power supply with a standard web browser.


CrateController - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://192.168.91.5/
VME3000
W-IE-NE-R
MAIN POWER
VME SYSRESET
FAN SLOWER
FAN FASTER
Global Status
Power Supply Status OFF
CPU Status OK
Fan Speed 2000 RPM
Output Voltages
Channel Name Voltage Status
U0 VME +5V 0.00V OFF
U1 VME +12V 0.00V OFF
U2 VME V1 0.00V OFF
U3 VME +3.3V 0.00V OFF
U4 n.c. 0.00V OFF
U5 VME -12V 0.00V OFF
U6 VME V2 0.00V OFF
U7 n.c. 0.00V OFF
External Temperature Sensors
1 2 3 4 5 6 7 8
27°C 35°C 31°C OFF OFF OFF OFF OFF
Digital Input Pins
0 1 2 3 4 5 6 7
State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0
Digital Output Pins
0 1 2 3 4 5 6 7
State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0 State@ 0
GMT/UTC: Fr, 16:46 Reykjavik: Fr, 16:46 Dublin: Fr, 17:46 Amsterdam: Fr, 18:46 Kiev: Fr, 19:46 Fertig

Any write access to the web page (e.g. switch on/off) requires a user name and password. The user name is “private”, the default password is “private”, too.

8 SNMP Control

The SNMP (Simple Network Management Protocol) is generally used to monitor and control computers and network routers.

WIENER claimed a specific part of the SNMP namespace and implemented power supply specific items there. Protocol version 1 and 2c is implemented.

The tree view of the implemented items is appended in 9 SNMP OID Tree.

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

If you are new to SNMP the www.Net-SNMP.org website is a good start.

9 OPC Server

A server according to OPC Data Access V2.05 is optional available.

OPC (**O**LE for **P**rocess **C**ontrol) allows fast and secure access to data and information under Windows operating systems. As an industry-spanning, multi-vendor software interface, OPC minimizes connection and maintenance overheads.

This server, running on a Computer with the Microsoft Windows XP operating system, enables access to all controllers which are connected to the network (TCP/IP). It is possible to

- access from any OPC Client application to the data of one or more servers
- encapsulating the properties specific to the server and type of communication
- commissioning support due to automatic scanning of the network and registration of communication stations
- restricting access rights by the underlying Microsoft DCOM.

The details of the OPC server can be found in the manual delivered with the OPC server software.

Appendix A: Data Sheet

Analog Measurement		
Analog Input Range	0 ... 3 V	unipolar
Impedance	10 kOhm ± 0.1 %	input to differential amplifier
common mode range	0 ... 4 V	
accuracy	0.1 %	typical, full scale
resolution	12 bit	
Temperature Measurement		
Measurement Range	-25 °C ... +125 °C	
accuracy	± 1 °C	typical
Communication	Ethernet 10/100M	BOOTP/DHCP or fixed IP address
	USB 2	isolated from system ground

Appendix B: Ordering Information

0377.J177 VME 3000 BIN with the following options:

- 3 temperature sensors at both CPCI power supply slots and VME slot 1
- Additional switched mains output connector at the rear
- CPCI mains supply switchable via network
- Additional front panels for unused slots
- Fan speed programmable via network

0R00.0004 CML 02 VME 6U Control, Measurement and Data Logging System

0316.007C Fan Tray

0400.0000 Compact-PCI power supply 500W

Appendix C: SNMP OID Tree

Only a small part of general SNMP OIDs is implemented. This is the tree view:

```
+--iso(1)
   |
   +--org(3)
      |
      +--dod(6)
         |
         +--internet(1)
            |
            +--directory(1)
            |
            +--mgmt(2)
            |  |
            |  +--mib-2(1)
            |     |
            |     +--system(1)
            |     |  |
            |     |  +-- -R-- String    sysDescr(1)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- ObjID     sysObjectID(2)
            |     |  +-- -R-- TimeTicks sysUpTime(3)
            |     |  +-- -RW- String    sysContact(4)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysName(5)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysLocation(6)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- INTEGER   sysServices(7)
            |     |  |        Range: 0..127
```

This is the tree view of the W-IE-NE-R-specific SNMP namespace. It could be generated with the command „snmptranslate -w 80 -Tp WIENER-CRATE-MIB::wiener“. Because it's a general definition, usable for different types of crates, some items may be not implemented in the real hardware. Here the not relevant parts are omitted.

The wiener OID is located at iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

```
+--crate(1)
   +--system(1)
   |  +-- -RW- EnumVal   sysMainSwitch(1)
   |  |        Values: off(0), on(1)
   |  +-- -R-- BitString sysStatus(2)
   |  |        Values: mainOn(0), mainInhibit(1), localControlOnly(2),
   |  |                inputFailure(3), outputFailure(4), fantrayFailure(5),
   |  |                sensorFailure(6), vmeSysfail(7),
   |  |                plugAndPlayIncompatible(8)
   |  +-- -RW- EnumVal   sysVmeSysReset(3)
   |  |        Values: trigger(1)
   |  +-- -RW- Integer32 sysDebugMemory8(1024)
   |  |        Range: 0..255
   |  +-- -RW- Integer32 sysDebugMemory16(1025)
   |  |        Range: 0..65535
   |  +-- -RW- Integer32 sysDebugMemory32(1026)
   |           Range: -2147483648..2147483647
   |
   +--input(2)
   +--output(3)
   |  +-- -R-- Integer32 outputNumber(1)
   |  |        Range: 0..1999
   |  |
   |  +--outputTable(2)
   |  |  |
   |  |  +--outputEntry(1)
   |  |     |  Index: outputIndex
   |  |     |
   |  |     +-- ---- EnumVal   outputIndex(1)
   |  |     |        Values: u0(1), u1(2), u2(3), u3(4), u4(5), u5(6), u6(7),
   |  |     |                u7(8)
   |  |     +-- -R-- String    outputName(2)
   |  |     |        Textual Convention: DisplayString
   |  |     |        Size: 1..4
   |  |     +-- -RW- Integer32 outputGroup(3)
   |  |     |        Range: 0..1999
   |  |     +-- -R-- BitString outputStatus(4)
   |  |     |        Values: outputOn(0), outputInhibit(1),
   |  |     |                outputFailureMinSenseVoltage(2),
   |  |     |                outputFailureMaxSenseVoltage(3),
   |  |     |                outputFailureMaxTerminalVoltage(4),
   |  |     |                outputFailureMaxCurrent(5),
   |  |     |                outputFailureMaxTemperature(6),
   |  |     |                outputFailureMaxPower(7),
   |  |     |                outputFailureTimeout(9),
   |  |     |                outputCurrentLimited(10), outputRampUp(11),
   |  |     |                outputRampDown(12)
   |  |     +-- -R-- Opaque    outputMeasurementSenseVoltage(5)
   |  |     |        Textual Convention: Float
   |  |     |        Size: 7
   |  |     +-- -R-- Opaque    outputMeasurementTerminalVoltage(6)
   |  |     |        Textual Convention: Float
   |  |     |        Size: 7
   |  |     +-- -R-- Opaque    outputMeasurementCurrent(7)
   |  |     |        Textual Convention: Float
   |  |     |        Size: 7
   |  |     +-- -R-- EnumVal   outputMeasurementTemperature(8)
   |  |     |        Values: ok(-128), failure(127)
   |  |     +-- -RW- EnumVal   outputSwitch(9)
   |  |     |        Values: off(0), on(1)
   |  |     +-- -RW- Opaque    outputVoltage(10)
   |  |     |        Textual Convention: Float
   |  |     |        Size: 7
   |  |     +-- -RW- Integer32 outputAdjustVoltage(11)
   |  |     |        Range: -128..127
```

```
|   |      +-- -RW- Opaque    outputCurrent(12)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputVoltageRiseRate(13)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputVoltageFallRate(14)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Integer32 outputSupervisionBehavior(15)
|   |      |        Range: 0..65535
|   |      +-- -RW- Opaque    outputSupervisionMinSenseVoltage(16)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputSupervisionMaxSenseVoltage(17)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputSupervisionMaxTerminalVoltage(18)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputSupervisionMaxCurrent(19)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputConfigMaxSenseVoltage(21)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputConfigMaxTerminalVoltage(22)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputConfigMaxCurrent(23)
|   |      |        Textual Convention: Float
|   |      |        Size: 7
|   |      +-- -RW- Opaque    outputSupervisionMaxPower(24)
|   |               Textual Convention: Float
|   |               Size: 7
|   |
|   +-- -R-- Integer32 groupsNumber(3)
|   |        Range: 1..1999
|   |
|   +--groupsTable(4)
|      |
|      +--groupsEntry(1)
|         |  Index: groupsIndex
|         |
|         +-- ---- Integer32 groupsIndex(1)
|         |        Range: 0..1999
|         +-- -RW- EnumVal   groupsSwitch(9)
|                  Values: undefined(-1), off(0), on(1)
|
+--sensor(4)
|   +-- -R-- Integer32 sensorNumber(1)
|   |        Range: 0..8
|   |
|   +--sensorTable(2)
|      |
|      +--sensorEntry(1)
|         |  Index: sensorIndex
|         |
|         +-- ---- EnumVal   sensorIndex(1)
|         |        Values: temp1(1), temp2(2), temp3(3), temp4(4), temp5(5),
|         |                temp6(6), temp7(7), temp8(8)
|         +-- -R-- Integer32 sensorTemperature(2)
|         |        Range: -128..127
|         +-- -RW- Integer32 sensorWarningThreshold(3)
|         |        Range: 0..127
|         +-- -RW- Integer32 sensorFailureThreshold(4)
|                  Range: 0..127
|
+--communication(5)
|   +--snmp(1)
|   |   |
|   |   +--snmpCommunityTable(1)
|   |   |   |
|   |   |   +--snmpCommunityEntry(1)
|   |   |      |  Index: snmpAccessRight
|   |   |      |
```

```
|  |  |     +-- ---- EnumVal   snmpAccessRight(1)
|  |  |     |        Values: public(1), private(2), admin(3), guru(4)
|  |  |     +-- -RW- String    snmpCommunityName(2)
|  |  |              Size: 0..14
|  |  |
|  |  +-- -RW- Integer32 snmpPort(2)
|  |
|  +--can(2)
|     +-- -RW- Integer32 canBitRate(1)
|     +-- -R-- String    canReceive(2)
|     |        Size: 14
|     +-- -RW- String    canTransmit(3)
|              Size: 14
|
+--powersupply(6)
|  +-- -R-- String    psSerialNumber(2)
|  |        Textual Convention: DisplayString
|  |        Size: 0..255
|  +-- -R-- Integer32 psOperatingTime(3)
|  +-- -RW- String    psDirectAccess(1024)
|           Size: 1..14
|
+--fantray(7)
|  +-- -RW- String    fanSerialNumber(2)
|  |        Textual Convention: DisplayString
|  |        Size: 0..14
|  +-- -R-- Integer32 fanOperatingTime(3)
|  +-- -RW- Integer32 fanAirTemperature(4)
|  +-- -RW- Integer32 fanSwitchOffDelay(5)
|  |        Range: 0..900
|  +-- -RW- Integer32 fanNominalSpeed(6)
|  |        Range: 0..3600
|  +-- -RW- Integer32 fanNumberOfFans(7)
|  |        Range: 0..12
|  |
|  +--fanSpeedTable(8)
|     |
|     +--fanSpeedEntry(1)
|        |  Index: fanNumber
|        |
|        +-- ---- Integer32 fanNumber(1)
|        |        Range: 1..12
|        +-- -R-- Integer32 fanSpeed(2)
|
+--rack(8)
+--signal(9)
   +-- -R-- Integer32 numberOfAnalogInputs(1)
   |        Range: 0..8
   |
   +--analogInputTable(2)
   |  |
   |  +--analogInputEntry(1)
   |     |  Index: analogInputIndex
   |     |
   |     +-- ---- Integer32 analogInputIndex(1)
   |     |        Range: 1..8
   |     +-- -R-- Opaque    analogMeasurementVoltage(2)
   |              Textual Convention: Float
   |              Size: 7
   |
   +-- -R-- BitString digitalInput(5)
            Values: d0(0), d1(1), d2(2), d3(3)
```